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A.D. 1817 . . . . . N° 4150.

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S P E C I F I C A T I O N

OF

LUDVIG GRANHOLM.

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PRESERVATION OF ANIMAL AND  
VEGETABLE SUBSTANCES.

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L O N D O N :

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## Preservation of Animal and Vegetable Substances.

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### GRANHOLM'S SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, LUDVIG GRANHOLM, of Foster Lane, in the City of London, Captain in the Royal Navy of Sweden, send greeting.

WHEREAS His present Majesty King George the Third did, by His  
5 Letters Patent under the Great Seal of Great Britain, bearing date the Fifth  
day of in August now last past, give and grant unto me, the said Ludvig Gran-  
holm, His especial licence, that I, the said Ludvig Granholm, my executors,  
administrators, and assigns, or such others as I or they should agree with, and  
no others, during the term of years therein expressed, should and lawfully  
10 might make, use, exercise, and vend, within England, Wales, and the Town of  
Berwick-upon-Tweed, and in all His Majesty's Colonies and Plantations  
abroad, my Invention of "A NEW OR IMPROVED METHOD OR METHODS, PROCESS OR  
PROCESSES, MEAN OR MEANS, OF PRESERVING SUCH ANIMAL AND VEGETABLE PRODUCTS  
OR SUBSTANCES SEPARATELY OR MIXED TOGETHER AS ARE FIT FOR THE FOOD OF  
15 MAN, AND FOR SUCH A LENGTH OF TIME AS TO RENDER THEM FIT FOR SHIP AND  
GARRISON STORES;" in which said Letters Patent is contained a proviso,  
obliging me, the said Ludvig Granholm, by an instrument in writing under  
my hand and seal, particularly to describe and ascertain the nature of my said  
Invention, and in what manner the same is to be performed, and to cause the  
20 same to be inrolled in His Majesty's High Court of Chancery within six  
calendar months next and immediately after the date of the said Letters  
Patent, as in and by the same, reference being thereto had, will more fully  
and at large appear.

NOW KNOW YE, that in compliance with the said proviso, I, the said  
25 Ludvig Granholm, do hereby declare that my said Invention is fully and



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particularly described and set forth in manner and form following, (that is to say) :—

The object of my said Invention is effected by cutting off all communication between the atmosphere and the articles to be preserved by one or other of the following means, viz<sup>t</sup> :—By pouring into the vessel in which the pieces of food that are to be preserved are packed melted and hot fat, or pouring in a strong hot animal fluid jelly, in such a manner, that not only all the interstices between the pieces, but the whole interior of the vessel, shall be so completely filled as to displace entirely all the atmospheric air ; or, secondly, by coating the different pieces with melted suet before they are packed in the vessel in which they are to be preserved, then packing them when cold, and afterwards displacing all the air from the pieces and from the whole interior of the vessel by pouring in cold a saturated aqueous solution of common sea salt or mineral culinary salt, that is to say, a solution of muriate of soda ; or, thirdly, when the article is such as to permit it (as, for example, butter,) by filling the vessel so completely with the article itself as to expel all the air, using due precautions to prevent the access of air afterwards by percolation or otherwise through the substance of the vessel. The vessels to be employed are adapted to the nature of the article to be preserved, to the manner of preservation, and to the quantity to be contained in the vessels. On these varieties of vessels I shall now give some necessary observations. For quantities not exceeding about fifteen pounds weight, vessels made of tinned iron, either square or cylindrical, or any other convenient form, are found to answer very well. These vessels should have a ring or fillet of tinned iron wire soldered all round their mouth on their outside, and at the distance of from one quarter to one half inch below the said mouth, on which ring or fillet the rim of the cover may rest when the cover is put on. To this ring the rim of the cover is to be soldered when the vessel is finally closed. The cover should be so formed that its centre should rise a little higher than the top of its rim, that is to say, it should be a little spherical, conical, or pyramidal, according to the form of the vessel. This elevation is given to the cover for the purpose of insuring a perfect dislodgement of air from the interior of the vessel, by pouring in well-warmed melted fat or suet, or hot liquid jelly, or a saturated solution of muriate of soda, as mentioned above, through a hole in the cover, the air escaping through a hole in the centre of the cover. The opening for introducing the said melted fat, or solution, or liquid jelly may be the same one by which the air escapes when displaced by the fluid. In this case the opening should be about a quarter of an inch in diameter ; or another opening for pouring in the fluid may be made in some other part of the cover, about an



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inch in diameter, into which a piece of pipe should be soldered air-tight, on the inside of the cover, about an inch long, and narrowing a little towards its lower orifice. In this case the hole in the centre of the cover for the escape of air need not be made more than a sixteenth of an inch in diameter. The opening of such a vessel is effected by driving down the ring or fillet by means of a hammer and the side edge of a chisel or a flat bar of any kind, beginning at one end of the wire, and so detaching the parts in succession till the whole is separated, by breaking the solder joining. For this reason, no more solder should be applied in fastening on the rings or fillets, and afterwards the covers, than is necessary to secure the exclusion of the air. This kind of vessel answers for articles that are to be packed up in their hot state, as hereafter described.

Sometimes I construct them in a manner different from that just described. Instead of fitting the rims of the covers to the outsides of the vessels, I make the diameter of the rims somewhat less than that of the vessels, and make them to lodge in a groove, the bottom of which forms an acute angle with the inside of the mouth of the vessel, filling the space between the rim of the cover and the side of the vessel with any proper luting or cement when the vessel is to be closed, the said space being left wide enough to allow the introduction of the cement or luting. These vessels are adapted for articles packed up cold, hereafter described.

Other materials, as earthenware or pottery, glass, and even wood, with proper precautions, may be employed. The means and precautions to be used in preparing the vessels are the following:—

First mean, applying in a hot state all over their outer surface, and over the surface of their covers, some good varnish or resinous substance.

Second mean, saturating them as much as the nature of the material of which they are made will admit, and as completely as possible, from their inside, with a saturated aqueous solution of common sea salt, or native salt, say, of muriate of soda.

Third mean, lining them with a coating of any substance or mixture not deliterious or injurious (as suet, or wax, or a mixture of these,) that can prevent the articles put in them for preservation from coming into actual contact with the vessels or their covers.

Fourth mean, inclosing the vessels within other vessels or boxes, leaving a little space between them to be filled up with tallow or wax, or a mixture of these, or any other substance or mixture which may answer the purpose of excluding the contact of the atmosphere from their sides and bottoms, their covers to be also coated over with the same.

One or more of these means are employed to prepare and preserve the



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vessels in a state fit for the duty assigned to them, varying their application according to the nature of the materials of which the vessels are formed. If the said vessels are made of metal or of earthenware, I use the first and third, or the third and fourth means; the interior surface of these vessels should be left unglazed. If they are made of glass, I employ the fourth mean; if they are made of wood, and to contain articles surrounded with a solution of muriate of soda, I use the first and second, or the second and fourth, or the third and fourth mean, but first I char the inside of the wooden vessel. When the foresaid vessels of tinned iron are employed, they are previously to be cleansed well with hot water, and if boiled in water for an hour or more, the better; when taken out of the water, they are to be quickly but carefully wiped and dried; after which, if the articles are to be packed in them are not coated over with suet, as more particularly described hereafter, they should be well greased all over their inside; but if the articles are to be so coated over, then the vessel, instead of being greased, should be lined with a coat of melted wax or of tallow, which is best effected by warming the vessel a little, and pouring the melted wax or tallow into it, and then turning it in different directions till the melted substance is brought into contact with the whole of its surface; this may be done a second and a third time, or oftener, when the coating for greater security is to be made thick, as, for example, a quarter of an inch in thickness; (the edges must also be well coated; if tinned over before coated, the better). The articles to be preserved are cooked in any of the usual manners by roasting, boiling, baking, or other ways, and when ready, and not to be coated, they are to be placed in their hot state in a vessel made of tinned iron, the said vessel being previously heated. If the article is meat, in its own soup or fluid jelly, the soup or fluid jelly should be so strong that it will be solid when cold; the vessel being filled nearly to the mouth, the cover is then to be put on and soldered air-tight all round; after which is to be filled completely through the hole made in the cover for that purpose. If the articles are not so dressed as to furnish a jelly, still they are to be packed; hot fluid jelly or melted warm fat is to be added, the cover soldered on, and then the remaining air expelled by pouring in melted and well-warmed suet or hot jelly, till the cover itself is filled to the opening in its centre with the melted suet or jelly; after it is thus filled, it should be allowed to stand for ten or fifteen minutes (in such a situation as to prevent partial chilling) before closing the opening or openings (as the case may be) in the cover, to allow time for the fluid jelly or fat to insinuate itself completely into the pores of the pieces; if in that time any shrinkage has taken place, the vessel must have this supplied by pouring in a little more fat or hot fluid jelly, after which



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the opening or openings in the cover are to be closed, of which more hereafter. When the articles are to be preserved, coated over as described hereafter, they may also be packed in vessels of tinned iron, lined with a coating of wax or tallow, as described above, but these are packed cold; and instead of expelling  
 5 the air by means of melted suet or hot fluid jelly, in this case a cold saturated solution of muriate of soda is to be employed; the last operation with these vessels is to close the hole or holes in the covers. When the cover is furnished with a pipe besides the centre hole, the former is to be closed with a cork going into it, so as to leave a part of the pipe empty above the cork; this  
 10 space above the cork is then to be filled with any good resinous cement or with wax, after which a bit of tinned iron is to be soldered over the hole. The hole in the centre may be closed by soldering, or the centre hole may be a female screw through a bit of iron coated with tin, and soldered on the outside, and fitted with a short screw of tin or of iron tinned all over, and when  
 15 screwed home then covered with solder. When but one hole is in the cover, both for finally filling the vessel and for the escape of the air, the edge of this hole should be worked so as to project upwards a little, just sufficient to hold a well-shaped cork in its place when driven home; the top of the cork is then to be cut off, some rosin or tallow melted over the cork, and a small cover of  
 20 tinned iron is then to be laid over it and fastened with solder, or a male and female screw may be employed for this, as has just been described. N.B.—When the cover has two holes, the funnel employed for filling must fit the pipe in the cover pretty well, or be made to fit by winding something round it; this hole with the pipe being lower than the centre hole, and the  
 25 cork employed for closing the pipe or the hole in the centre of the cover should be previously soaked in melted suet or tallow.

I have already alluded to articles that are to be preserved coated. These coated articles, as already mentioned, may be preserved in the vessels of tinned iron, if properly lined with wax or tallow, in quantities so small as fifteen or eighteen pounds; but the principal reason for preserving articles coated is for the convenience of having them packed in large vessels containing from eighteen to fifty or one hundred or more pounds weight. Where large quantities packed hot in the manner before described, the very heat contained by the articles themselves would too much overdo the meat and  
 35 destroy its texture. To prevent this, the separate pieces from about three to six pounds each, or two or more of them tied together with prepared strings (of which hereafter), are placed in a mould while hot, and surrounded with melted and well-warmed suet; each mould and its contents is then suffered to cool, and when cold, the entire mass of hard suet containing its piece or pieces



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is taken out of its mould ; the coating of suet now serves as a case for the meat which it contains, and any number of these pieces which may be required or convenient may then be placed in one sound case or vessel made of wood ; if this wooden vessel is not to be covered with another, it is prepared for receiving the coated meat by charring the inside, varnishing the outside, and 5 saturating its inside with a solution of muriate of soda, as before directed ; or, instead of this saturation, the inside may be well coated with tallow, or even with rosin melted with a little addition of tallow. If the vessel is to be inclosed in another, and surrounded with tallow or rosin, any substance calculated to prevent the access of air ; in this case its outer surface does not require 10 to be varnished. The strings employed to tie two or more pieces together, and for suspending these and the single pieces in their respective moulds, so as to keep them from touching the mould while the melted suet is being applied, ought to be first boiled in clean water for an hour or longer, then well dried, and thereafter soaked for some time in hot melted suet. The coating should in no 15 part be less than three-eighths of an inch in thickness ; if thicker, it is no disadvantage. If the meat has been cooked by boiling in water or in steam, it should be hung up for a few minutes to allow the water to run off, and then well wiped with a clean cloth before it is put in its mould. When the mould is to be removed, the string should be previously cut off under the surface of the 20 coating, and the little hole thus made should be filled with fat or suet. When the coated pieces are placed in the vessel, the cover or head is then to be secured in its place, after which the vessel must be placed in such a position that one of its corners, if a square vessel, or a part of its chime, if a cask, shall form the highest point ; in this place a hole must be made by a small auger 25 to allow the pouring in of the solution of muriate of soda, and when filled the hole must be closed with a cork previously soaked in melted suet. It should be noticed, that even wooden vessels may be made with the interior of their cover rising in the centre, to allow the displacement of the air when standing on their bottoms, as already described when speaking of the vessels made of 30 tinned iron.

I have already mentioned that some articles, as, for example, butter, admit of being preserved in contact with the vessel that contains them ; this is the case if the butter be put into glass vessels. When vessels of pottery are employed, they are preferable, when, instead of being glazed within, they 35 are impregnated with melted wax or tallow, or fully saturated with a solution of muriate of soda ; if wooden vessels are employed for this purpose, they should first be well varnished on the outside, and then saturated within with muriate of soda. If, owing to the form of the vessel or its cover,



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any empty space is left, the air contained therein should be displaced by pouring in, as before directed, a saturated solution of soda. Butter may also be preserved, deposited in the middle of its containing vessel, and surrounded completely with the said solution; in this case the vessel may either be one  
5 varnished or glazed on the outside, and saturated with the said solution within; or a vessel lined with a coating of melted suet, or a mixture, as before described, may be used. When to be so surrounded, the butter is first moulded into a form similar to the vessel, but so much less in all its dimensions as to be kept a half inch from the containing vessel all round, and below, and above.  
10 Below the butter is introduced a false bottom, half an inch thick, previously soaked for at least twenty-four hours in the said solution of salt; a false cover, prepared in the same manner, is placed over the butter, and through notches in this cover four or more pieces of wood of a length equal to the depth of the vessel are passed, descending into similar notches in the false bottom;  
15 these pieces of wood must also be saturated with the said salt solution, as the use of the false bottoms are merely for preventing the butter from touching the bottom and the cover of the vessel itself; other means (made of wood and well saturated with the said solution) which can answer the same purpose may also be used instead of that just described. The cover of the vessel is  
20 then to be secured air-tight in its place, and all air to be dislodged from the interior by pouring in a solution of muriate of soda, as before described, and the hole by which the air escaped is to be securely closed. As it is often desirable on long voyages that vegetables should be had along with the preserved meat, I have to observe that those which I prefer are potates and carrots; they  
25 should be dressed each by themselves; after which they may either be cut into small pieces and mixed with the meat, which in its dressing produces its own jelly; or they may be put into a vessel alone, and then surrounded with melted fat or jelly in such a manner as effectually to dislodge all air from the interior of the vessel, as before directed for preserving meat, taking care to  
30 close the vessel properly. In every case, whether the articles to be prepared are flesh, fish, fowls, or vegetables, I have them fully cooked before inclosing them in their containing vessel; nor do I ever put the vessels, after the air is completely expelled and the opening or openings closed, into a water bath, or into a steam bath, or into an oven, or apply heat to them in any way of a higher  
35 degree than the common temperature to which they may be exposed in usual and common circumstances.

In witness whereof, I, the said Ludvig Granholt, have hereunto set my hand and seal, the Third day of February, in the year of our Lord One thousand eight hundred and eighteen.

L. GRANHOLM. (L.S.)



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J. CAMPBELL.

**AND BE IT REMEMBERED**, that on the same Third day of February, in the year above mentioned, the aforesaid Ludvig Granholt came before our Lord the King in His Chancery, and acknowledged the Specification aforesaid, and all and every thing therein contained, in form above written. And also the Specification aforesaid was stamped according to the tenor of 5 the Statute in that case made and provided.

Inrolled the same Third day of February, in the year above written.

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